



# LOS LUNAS PLANT MATERIALS CENTER 2016 PROGRESS REPORT OF ACTIVITIES

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## MORPHOLOGICAL EVALUATION OF 8 SOURCES OF ARRIBA WESTERN WHEATGRASS

A morphological evaluation of eight different seedlots from different seed producers had been conducted in order to determine whether there has been a migration of traits from the original release 'Arriba' western wheatgrass (*Agropyron smithii* Rydb. A. Love). Twenty-five seedlings were propagated from each seedlot for this determination. A one way ANOVA for both height and tiller length of each seedlot was compared to the seed obtained from the Germplasm Repository Inventory Network, designated as the standard, in which variance levels were analyzed. Results indicated there was no difference in plant height among the germplasm sources, however, tiller length among the Arriba seed lots was highly significant ( $P < 0.0005$ ).

It was concluded that Arriba western wheatgrass is a cross-pollinated single-origin accession that was not bred to isolate desirable genes utilizing a recurrent selection breeding process; for that reason this allo-octoploid maintains great heterozygosity. In addition, considerable ecotypic variation exists among western wheatgrass populations for important agronomic traits including forage yield and plant height; consequently uniformity among phenotypes of Arriba should not be expected due to its homology and ecotypic variation. These findings are important because of the ever increasing concern of climate change and the capacity for adaptation. This evaluation suggests the native grass allopolyploids released by the Natural Resource Conservation Service-Plant Materials Program will adapt to changing site conditions.

**Table 1. Fisher's least significant difference of means of morphological traits of 8 seed lots of Arriba western wheatgrass, USDA-NRCS Los Lunas, NM 2016.**

Trait		
Seed lot	Height	Tiller Length
	---cm---	---cm---
NPGS:PI 578777	91.31a <sup>3/</sup>	67.56 a
Southwest Seed: 2014 1045	91.24 a	57.91 ab
Pawnee Butte: 014-7363	90.55 a	56.79 c
Granite Seed: AGSM-NBS-TCA-ARR1	90.22 a	68.38 a
UCEP: SFD-11-Blend	89.26 a	56.69 c
UCEP: SFD-11-Blend	87.40 a	55.37 c
UCEPC: SFD-07-UC4	83.82 a	52.02 c
UCEPC: 2014	87.71 a	66.04 ab

1/ Height (5/19/16); 2/ Tiller length (5/3/16); 3/ Means in columns followed by the same letters are not significantly different at  $P < 0.05$

## NATIONAL COVER CROP ADAPTATION TRIAL

In 2016, the Los Lunas Plant Materials Center installed the NRCS Plant Materials Program National Cover Crop Adaptability Trial. This trial is a two-year Plant Materials Program study to examine the adaptability of eight important cover crop species in different geographical regions at PMC's across the country. Data collected from the trial includes: germination and field emergence, spring green-up bloom and flowering period, plant height, disease and insect resistance, and winter hardiness. This data will be analyzed to determine recommendations in conservation plantings as well as for future soil health studies.

The potential benefits of cover crops are many that include; enhancing yields by improved soil health, prevention of soil erosion, providing habitat for beneficial insects, weed suppression and biomass production.

**Table 2. Species and Cultivars Evaluated in the National Cover Crop Adaptation Trial at the LLPMC**

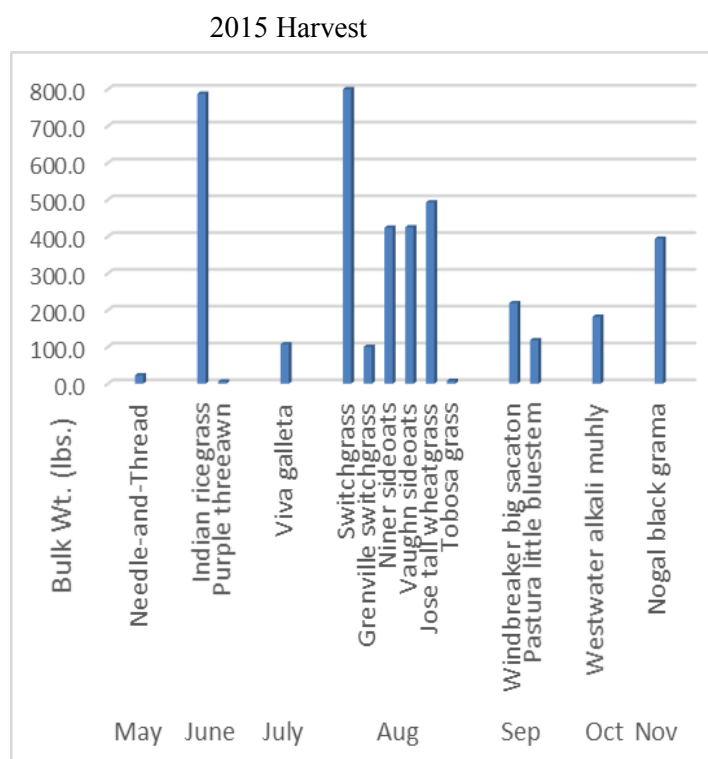
Species	Cultivars
Balansa clover (annual legume)	Fixation, Frontier
Black oat (winter grass annual)	Cosaque, Soil Saver
Cereal Rye (annual grass) High biomass production.	Guardian 301, Maton, Aroostook, Maton II, Elbon, Guardian 308, Brasetto, FL401, Wrens Abruzzi, Prima, Merced, Hazlet, Oklon, Wintergrazer, Wheeler
Crimson clover (winter annual legume) Habitat and nectar source for beneficial insects.	AU Robin, AU Sunrise, AU Sunup, Cantea, Dixie, Kentucky Pride
Daikon Radish (annual radish) Long taproot that breaks up compaction and provides aeration.	Nitro, Sodbuster blend, Lunch, Eco-Till, Groundhog, Tillage, Driller, Defender
Hairy Vetch (cool-season biennial or annual legume)	Lana, Groff, Valana, Purple Prosperity, TNT
Red clover (biennial or short-lived perennial legume)	Cyclone II, Dynamite, Freedom, Kenland, Cinnamon Plus, Starfire, Starfire II, Wildcat
Austrian winter Pea (annual legume)	Arvica 4010, Whistler, Frostmaster, Dunn, Lynx, Survivor, Windham, Maxum



**Photo of 236 plots containing 59 cultivars within the study**

## SEED PRODUCTION

The New Mexico Plant Materials Center delivers products to our customers that solve conservation concerns within the Los Lunas Plant Materials Center (LLPMC) service area. To facilitate better conservation methodologies, the LLPMC develops improved species and conservation techniques to mitigate gully erosion, revegetate disturbed lands, reduce erosion, increase rangeland and cropland productivity, and establish shelterbelts. The species we currently propagate includes both warm- and cool-season grasses.



**Figure 1. Bulk seed weights by species produced at the NRCS-LLPMC in 2016 totaling 4,216 pounds**

## NEW BREEDER BLOCKS

The LLPMC produces breeder and foundation seed for distribution to commercial growers. The growers in return produce registered and certified seed of the releases for sale to the public. A consumer should when possible purchase only certified seed to ensure plant performance.

The following new breeder blocks were installed in 2016.

- ◆ ‘Arriba’ western wheatgrass is a cool-season, perennial, sod-forming grass tolerant to moderately saline and alkaline soils. It is an excellent soil stabilizer and is palatable for all classes of livestock.
- ◆ ‘Luna’ pubescent wheatgrass is a cool-season, perennial, drought resistant grass. It requires a little more moisture than crested wheatgrass because of its larger stature.
- ◆ ‘Redondo’ Arizona fescue is a cool-season, long-lived, bunchgrass. It has an extensive fibrous root system for excellent soil stabilization and it is a good source of forage for all classes of livestock.
- ◆ ‘Hachita’ blue grama is a warm-season densely tufted grass that grows well on all soil textures. It is highly palatable to livestock and cures well on the ground retaining as much as 50 percent of its nutritive value.
- ◆ ‘Alma’ blue grama is a warm-season grass for planting at deeper depths. It is used in mixtures designed for erosion control and rangeland improvement.
- ◆ ‘Salado’ alkali sacaton is a warm-season grass adapted to moderately alkaline soils of bottomlands and flats, on sandy plateaus, and washes. It is a good source of forage.



**Combine Harvest of Vine Mesquite**



**Salado and Alma growing in the same field.**

## END OF AN ERA FOR NMPMC LONGSTEM TECHNOLOGY

The Los Lunas Plant Materials Center began investigating deep planting methods over two decades ago to establish riparian vegetation with minimal or no supplemental irrigation to improve survival rates and thereby reduce revegetation costs. As a result, the PMC began producing various plant species grown in 30-inch deep pots (tallpots) to be installed into the capillary fringe with the use of an auger. This technique was very successful because it allowed for rapid root extension and establishment into the soil horizon containing intermittent moisture. Following the success of the tallpots, the PMC began pilot testing of one-gallon treepots to reduce the expense of production by reducing the container size. This too was very successful in the revegetation of many different species. Species that were amenable to longstem deep plantings included: golden currant (*Ribes aureum*), screwbean mesquite (*Prosopis pubescens*), skunkbush sumac (*Rhus trilobata*), netleaf hackberry (*Celtis reticulata*), false willow (*Baccharis salicina*), false indigo (*Amorpha fruticosa*) just some of the many species that this technology facilitated in revegetating areas with water tables no deeper than 8 feet.



**New Mexico olive longstem stock in one-gallon treepots**

The success of this technology prompted the private industry to provide this product, thereby, necessitating the closure of the containerized nursery at the PMC. Tallpots can be ordered from the High Mountain Nursery located in Park City, Utah.

## WHERE ARE ALL THE TALLPOTS GONE, LONG TIME PASSING...

Approximately 15,640 longstem plants were donated to the following organizations for the purposes of conservation, restoration or remediation.

Upper Pecos Watershed Association  
Whitfield Wildlife Conservation Area  
City of Albuquerque Open Space Division  
State of NM Game and Fish  
Save our Bosque Task Force  
Rio Grande Nature Center State Park  
Gila National Forest  
Southwestern Indian Polytechnic Institute  
Bureau of Land Management  
Tamarisk Coalition (Colorado)  
Town of Lyons Flood Recovery Project (Colorado)  
Expo New Mexico  
Valencia Community Gardens  
Meadow Lake Area Association  
City of Albuquerque Bio Park  
Village of Bosque Farms  
NMSU Plant Sciences Dept. LL Agriculture Science Center  
Socorro Soil & Water Conservation District 1st Donation  
FWS Sevilleta National Wildlife Refuge  
Rio Grande Nature Center State Park  
City of Truth or Consequences  
Town of Mountainair  
Village of Wagon Mound  
Taos County  
Belen Family School Science Club  
Cuba Field Office  
Carrizozo SWCD  
Village of Milan  
Eagle Nest  
Sandia Ranger District  
FWS Bosque del Apache National Wildlife Refuge  
Santo Domingo Tribe  
Keep Lovington Beautiful  
Pueblo of Sandia  
Navajo H2O Missions Gardens  
Mosquero Municipal School  
Zuni Pueblo  
Catherine A. Miller Elementary  
Cibola County

## TOURS

The LLPMC has a large diversity of crops grown at the facility. The staff provide many tours throughout the year to various groups of people.



Conservation partners touring the LLPMC in August

## TRAININGS

- ⇒ Optimizing Planting Success in an Arid Terrain, Marble Canyon, AZ
- ⇒ Building Pollinator Habitats, Cuba, NM
- ⇒ Species Selection and Planting Techniques for Success, New Mexico Nature Center



Pathway Students learning how to construct willow fascines

## AWARD

Staff receive a Special Recognition Award from the National Park Service for native plant technical assistance, technology development and seed and plant propagation in the support of their revegetation challenges



## PRESENTATIONS

Tamarisk Coalition Conference in Albuquerque, NM  
Society for Range Management in Tome, NM

## OFF SITE PLANTINGS



Four leguminous species were installed in a Pecan Orchard as a pilot test on behalf of the Las Cruces Field Staff.



A collaboration of PMC, NPS, NPS Technical Advisor (Chris Taliga), and Vanderbilt Students for the installation of tallpots at Glen Canyon National Recreation Area

## LOS LUNAS PLANT MATERIALS CENTER

The Natural Resources Conservation Service Los Lunas Plant Materials Center (LLPMC) is one of 25 federally funded Centers nationwide. The LLPMC is operated under a cooperative agreement with New Mexico State University in which we share approximately 200 acres. The acreage we operate includes production of Foundation Seed, testing and selection of potential releases, evaluation studies in support of Field and Technical Staff, as well as, production fields for partners that do not have the infrastructure for seed production.



Aerial view of the Los Lunas Plant Materials Center

Originally, the LLPMC was located north of Albuquerque by the Sandia Indian Reservation from 1937 to 1952. In 1957, the center was re-located to its present location. The LLPMC serves several major land resource areas that have in common characteristics of climate, topography, soil and water resources. Our region includes Southeast Colorado, New Mexico, Southeast Utah, Southwest Texas, and Northeast Arizona. Our mission is to develop, test, and transfer plant science technology to meet customer and natural resource needs. We also provide trainings that facilitate best management practices of conservation.

We strive to increase and strengthen our current collaborative partnerships with NRCS field offices, public agencies, universities, conservation organizations, tribes, commercial seed producers and nurseries. Together we can determine the best conservation plants and techniques that will facilitate optimal success.

## TECHNICAL DOCUMENTS

The following release brochures have been updated:

<http://www.nrcs.usda.gov/wps/portal/nrcs/main/plantmaterials/pmc/west/nmpmc> provides the link to zip bundle:

- 'Grant' cane bluestem (*Bothriochloa barbinoides*)
- 'Llano' Indian ricegrass (*Sorghastrum nutans*)
- 'Lovington' blue grama (*Bouteloua gracilis*)
- 'Niner' sideoats grama (*Bouteloua curtipendula*)
- 'Nogal' black grama (*Bouteloua eriopoda*)
- 'Redondo' Arizona fescue (*Festuca arizonica*)
- 'Salado' alkali sacaton (*Sporobolus airoides*)
- 'Tusas Germplasm' bottlebrush squirreltail (*Elymus elymoides*)
- 'Elida' sand bluestem (*Andropogon hallii*)
- 'Pastura' little bluestem (*Schizachyrium scoparium*)
- 'Vaughn' sideoats grama (*Bouteloua curtipendula*)

In addition, the following publications also are available from the website:

- *Arriba Western wheatgrass (Pascopyrum smithii (Rydb) A. Love) Morphological Evaluation of 8 Germplasm Sources*, Final Study Report.
- *Establishment of Pollinator Plants by Direct Seeding in Flood Irrigation Fields at the Los Lunas Plant Materials Center*, Final Study Report
- *Milkweed Seed Production Trials for the Xerces Society*, Final Study Report
- *Pollinator Plant Recommendations for New Mexico*, Technical Note No. 71 (Final Revision)
- *New Mexico Seed Laws and Regulations*, Technical Note No. 74
- *'Windbreaker' Big Sacaton for Use in Herbaceous Barriers and*

## LOS LUNAS PLANTS MATERIAL STAFF

Bernadette Cooney, PMC Manager (ext.105)

Keith White, Bio-Science Technician (ext. 111)

## 2016 RETIREE

Danny Goodson, Agronomist- 42 years of dedicated service



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